

# **SANDIA REPORT**

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## **Waste Assessment Baseline for the IPOC Second Floor, West Wing**

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### **Abstract**

Following a building-wide waste assessment in September, 2014, and subsequent presentation to Sandia leadership regarding the goal of Zero Waste by 2025, the occupants of the IPOC Second Floor, West Wing contacted the Materials Sustainability and Pollution Prevention (MSP2) team to guide them to Zero Waste in advance of the rest of the site. The occupants are from Center 3600, *Public Relations and Communications*, and Center 800, *Independent Audit, Ethics and Business Conduct*.

To accomplish this, MSP2 conducted a new limited waste assessment from March 2-6, 2015 to compare the second floor, west wing to the building as a whole. The assessment also serves as a baseline with which to mark improvements in diversion in approximately 6 months.

## **ACKNOWLEDGMENTS**

Thanks to Bruce Fetzer, Michelle Fleming, Susan Harty, Stephanie Holinka, Timothy Riley, Valerie Smith, Emelda Solis, John Thompson and Ralph Wrons for their enthusiasm to reach Zero Waste and support in all aspects of making this study a reality.

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## **NOMENCLATURE**

DOE	Department of Energy
ECC	Environmental Compliance Coordinator
ES&D	Engineering Solutions & Design
IPOC	Innovation Parkway Office Center
MSP2	Materials Sustainability & Pollution Prevention
OUO	Official Use Only
PII	Personally Identifiable Information
SFW2	Second Floor, West Wing
UCI	Unclassified Controlled Information

# 1. INTRODUCTION

To support the request of Center 3600, *Public Relations and Communications*, and Center 800, *Independent Audit, Ethics and Business Conduct*, Materials Sustainability and Pollution Prevention (MSP2) conducted a limited waste audit from March 2-6, 2015 to compare the second floor, west wing to the building as a whole. It also created a baseline with which to mark improvements in diversion in approximately 6 months.

The data gathered from the September, 2014 and March, 2015 assessments will be used to compile an action list of improvements to reduce the creation of waste where possible, and increase diversion of the remaining waste.

## 1.1. Waste Assessment Bounds

The waste assessment from September, 2014 was conducted by Engineering Solutions & Design (ES&D). ES&D sorted and weighed all the trash removed from the building into categories of material that could have alternative dispositions. Using population, an estimate of waste per person per day, a weekly total waste, and a quarterly waste total were calculated. The materials diverted prior to be thrown away were not measured.

The waste assessment from March, 2015 performed by MSP2 was intended to capture the same data, plus quantify the materials diverted prior to be thrown away. Cardboard and packaging foam were not measured, except for where they appeared in the trash. Additionally, the central corridor of IPOC second floor, west wing (SFW2) that includes five conference rooms, two pairs of bathrooms, and an office, were not included in the diverted trash for assessment. This was an unintentional miscommunication with the janitorial service.

## 1.2. Performance

Due to excessive winds on the first day, the March 2014 assessment was performed inside, in the central break room on the second floor.

MSP2 set up a large tarp and six primary containers to receive sorted material. One, two or three bags of consolidated trash were generated each day. Tare weights of the yellow bins and yellow bins with additional liners were established. Other miscellaneous materials were accumulated in small piles. An Ohaus scale set to pounds with an accuracy to the tens place was used to measure the material. The data was written on a clipboard form and transferred to Microsoft Excel later in the day.



### 1.3. Data Collected

The initial list of materials being sought in the trash was more extensive than actually observed by the end of the week. The data presented later in this report is only of that which was found. Null values were removed.

## 2. SOLID WASTE ASSESSMENT

Based on the number of occupied seats in SFW2, it was determined that each occupant creates 1.3 pounds of trash per week.

As the waste was sorted, it was grouped into one of five categories: liquids; that which was thrown in the trash even though it already had a recycle path present in IPOC; that which is not recyclable at IPOC, but has options elsewhere on the Sandia campus; and, actual solid waste.

### 2.1. Liquids in the Trash

Another name for our trash is Commercial Solid Waste. Inherent to the name, there should be no liquids in the trash. Please:

- Start the habit of removing lids from to-go cups and bottles and recycling the lids in the plastic recycling bin; and
- Neatly dump unfinished beverages and ice out in a sink before disposing or recycling your beverage container.

As an anecdote, the firm that conducted the building-wide waste assessment in September, 2014 quipped that if they found a McDonald's coffee cup, it would be dry, but if they found a Starbucks cup, it would be half full.

### 2.2. Recyclable-at-IPOC Materials Found in Trash

The SFW2 is one sixth of the occupied area inside IPOC, and the population is almost evenly distributed.

If all occupants' waste-generating habits were the same, one sixth of the total building's total "recyclables found in the trash" would be the expected value from SFW2 in the table to the right.

Pounds/week	SFW2 <i>Actual</i>	SFW2 <i>Expected</i>	All IPOC <i>9/2014</i>
Mixed paper	14.55	31.45	188.7
Rigid Plastics #1-7	6.85	19.2	115.2
White paper	6.56	28.4	170.4
E-Scrap	0.95	n/a	no data
Aluminum	0.62	1.55	9.3
Cardboard	0.40	2.95	17.7

However, as shown in the SFW2 Actual column, the occupants of SFW2 already have superior recycling habits in comparison to the rest of IPOC.



### ***2.2.1. Mixed Paper***

Fifteen percent of the week's 95.4 pounds of trash consisted of mixed paper. Convenience and awareness are the two primary issues noted.

Actions:

- One rolling yellow cart for mixed paper should be placed in Center 800's large break room on the south side of the building.
- The yellow mixed paper bins should be distributed more conveniently through the suites, perhaps one per grouping of pods or large, shared office.
- Occupants should be reminded of what mixed paper can be, including:
  - Paper hot and cold to-go cups with the plastic lids removed;
  - Ream wrappers from copy paper; and,
  - Newspapers and junk mail.

### ***2.2.2. Rigid Plastics #1-7***

Rigid plastics, said to include stamped #1-7, has not been well communicated to Sandia as a whole. Changed in FY14 away from only accepting #1 and #2 bottles, to all plastics that can hold their shape, only the labels have been revised. The only opportunity for those in IPOC to see the revised label is in the central break room on each floor.

Actions:

- Deploy standard rigid plastics recycle bins, one to each suite.
- Occupants should be educated to the new criteria of what is acceptable in the plastics recycling, with focus on:
  - Plastic lids and spill-stoppers from hot to-go cups;
  - Plastic lids, straws, and cups from cold to-go cups; and,
  - That films and wrappers are not allowed.

### ***2.2.3. White Paper***

For IPOC as a whole, white paper being disposed in the trash is a growing problem since the building's first waste assessment in FY09. Despite diverting more than the rest of IPOC, white paper still makes up 7% of SFW2's daily trash. Often it was found to be torn into large chunks. Additionally, one instance of PII, one instance of OOU, and one packet of Lockheed Martin *internal use only* were found.

Actions:

- Educate occupants to not hand-tear white paper, but to utilize one of the shredders or a white destruction bag for UCI or sensitive documents.
- Educate occupants that no white paper should be in the trash.
- Assure every desk, network printer, and copier has a labeled white paper recycle bin, and that occupants know where to empty their bin when needed.

#### *2.2.4. E-scrap*

All electronics owned by Sandia, whether functioning or not, are required to go to Reapplication for disposition. If not sent for auction, electronics are managed through an [e-Stewards](#) certified electronics recycling vendor.

Specific items found include two green computer network cables, one USB cable, a Virgin Pulse pedometer, and a watch. The watch battery was alkaline and could be recycled in the brown battery recycle bins (one in each suite already). Unfortunately, the VirginPulse pedometer battery is Lithium. At Sandia, we have a very strict permit to generate hazardous waste from the State of New Mexico, and Lithium is one of the regulated materials. The battery should have been managed as a hazardous waste. For future help managing any potential hazardous waste, you may contact your [Environmental Compliance Coordinator](#) (ECC).

Actions:

- Educate occupants about used battery management at Sandia.
- Occupants should be reminded about Reapplication Services.

#### *2.2.5. Aluminum Cans*

Recycling of aluminum cans has been a primary recycle stream at Sandia for many years. Labels on the standard bins were recently refreshed to remove the ban on aluminum foil. An average of one aluminum can was found per day, indicating a very good participation rate.

Actions:

- Deploy standard aluminum can recycle bins, one to each suite.
- Occupants should be educated on the availability of aluminum can recycle bins and the value.

#### *2.2.6. Cardboard*

SFW2 was near-perfect on cardboard diversion. Only a few very small pieces were found in the trash, and those small pieces would not warrant a special trip to the cardboard recycling utility cart parked outside on the first floor.

Actions:

- Educate occupants that very small pieces of cardboard may be recycled in the mixed paper.

## 2.3. Other On-Campus Recyclables Found in Trash

IPOC is a leased building, not physically present on land owned by the Department of Energy (DOE). This impacts waste in several ways.

- The janitorial staff is contracted by the landlord, and not employees with Custodial Services. They do not have the contractual requirement, training, exposure, or inter-department agreements to support recycling.
- Unlike waste management on Sandia-occupied DOE land that is internally collected and managed all the way to the end vendor or landfill, once a bag of trash is placed in the compacting waste rolloff at IPOC, it gets hauled by the City of Albuquerque directly to their landfill.
- Recyclables often screened from the solid waste after collection cannot be placed in the solid waste or else be lost to the landfill, including loose cardboard, bags of aluminum, and bags of plastic.

Pounds/Week	SFW2
Wet Tissue and Papers	13.3
Glass Beverage Bottles	2.0
Coffee Pods	1.8
Metals (not aluminum)	1.8
Styrofoam #6, Plates & Cups	0.2
Frito Lay Snack Bags	0.1

As an adaption to having approximately 10% of Sandia's population in leased buildings and with the support of volunteers, Sandia has processes in place to collect certain recyclables. Opportunities for expansion of recycling services based on these existing processes are available.

### 2.3.1. *Wet Tissue and Papers*

This material includes facial tissue and paper towels. They can be wet or biologically contaminated. Paper towels used as napkins may have food debris. Paper towels out of bathrooms are often dry and fluffy by the time they are collected. This material is not suitable for recycle back into paper due to the potential for contamination and the lower grade of paper fibers commonly used for these products. However, both of these reasons make this material ideal for composting.

Sandia is contracted with a commercial composting facility to provide material pickup and composting services. Compost bins for paper should be established in the bathrooms and in key suite locations.

### 2.3.2. *Glass Beverage Bottles*

Sandia has a pilot program for glass bottles recycling through the City of Albuquerque, but Sandia's pilot has the possibility of being cancelled within the year. However, as the glass beverage bottles are only collected to the central two sites by volunteers, the same process could be set-up within IPOC, and the bottles would be directly delivered to the City at the Manzano Mesa Community Center recycling drop-off location (southeast of Eubank and Southern boulevards).

The cap would need to be removed (*see section 2.3.4. Metals*), the bottle rinsed out, and up to three small collection bins be placed in the three primary break areas between the two suites.

### **2.3.3. Coffee Pods**

Single serving coffee machines are becoming more popular at Sandia. The various machines that use coffee pods create a waste stream made of plastic, foil and wet coffee grounds. Utilizing TerraCycle's "Zero Waste Boxes", Sandia is using recycling revenues to pay for the recycling of coffee pods on a limited basis. Two hundred and seventy pounds have been shipped to-date.

From potentially two sources in IPOC SFW2, 34 coffee pods were found in the trash. If at least one collection bin were set up at the heaviest user, the lesser user could self-collect on a plate for later consolidation, or establish a second collection bin.

### **2.3.4. Metals (not aluminum)**

Metals other than aluminum are not generated in IPOC except in small, inconsistent quantities and types. Some examples found in the SFW2 trash include metal bottle caps, tin cans from food, name plates, paper clips, small wires, and picture frames.

MSP2 has a counter-top container available for the gathering all of these metals in one place. Tins cans would need to be rinsed free of all food residue. These bins could be paired with the identical (*except color: blue versus red*) bin from section 2.3.2. *Glass Beverage Bottles*.

### **2.3.5. Styrofoam #6, Plates and Cups**

A handful of clean plates and cups were found in the trash. Four years ago, Sandia used recycling revenues to invest in a piece of equipment that densifies several types of foam, including Styrofoam #6. Two years ago, Custodial Services took on managing Foam Cup Recycle Bins.

Deploying one foam cup recycle bin to each floor's main break room would provide the opportunity to participate.

### **2.3.6. Frito Lay Snack Bags**

Through Zero Waste Events, MSP2 began collecting Frito Lay-brand snack bags for recycle. They have now expanded to all four café's and a set of office trailers.

Deploying one Frito Lay-brand snack bag recycle bin to each floor's main break room would provide the opportunity to participate.

## 2.4. Solid Waste

What remains Solid Waste are materials that are very challenging to manage, too contaminated, or a mixed material (such a metal connected to a plastic).

Pounds/Week	SFW2
Food Waste	22.3
Non-bottle Glass	6.3
Clean Films	4.1
Other Solid Waste	18.5

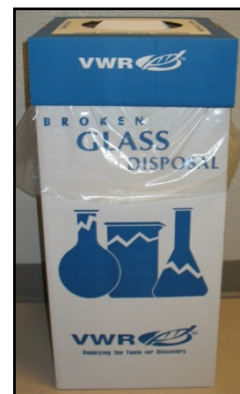
### 2.4.1. Food Waste

Food waste embodies all three of descriptors above. It is compostable, but a challenge to manage. It emits smells and rapidly begins breaking down. It is easily contaminated by the containers it came in, be they pouches, Styrofoam, or food wrap. Conversely, food waste readily contaminates the containers it came in and anything it touches on its way to disposal, preventing their easy diversion for recycle. If mismanaged, food waste can also become a vector for insects, rodents, or other pests.

Sandia is contracted with a commercial composting facility to provide material pickup and composting services. If paper composting is successfully established, those bins can be relabeled to allow food waste composting with minimal change in handling.

### 2.4.2. Non-Bottle Glass

Non-bottle glass is not recyclable and often hazardous to manage. Per Corporate Policy ESH100.2.ENV.22 *Manage Hazardous Waste at SNL/NM* in the table “Management of Common Waste Streams” we are directed to use Glass Box Receptacles to “safely segregate non-regulated broken or fragile glass from ordinary trash.” Glass Box Receptacles can be a Broken Glass Disposal box with liner that is ordered from Brady Industries through JIT, or a simple box that can be sealed with tape and labeled as containing glass.



### 2.4.3. Clean Films

Plastic films are non-rigid, and generally unable to hold their shape under their own weight. Examples include wrappers, shopping bags and trash can liners. Films are not recyclable when mixed with rigid plastics in this region. They have a tendency to become wrapped around and jam recycling sorting equipment. When clean films are kept separate, there is a greater chance at recyclability. Sandia currently captures clear stretch wrap (LDPE #4 film), from large generators such as Receiving and Reapplication.

Two opportunities for reduction or reuse were observed during the waste assessment of IPOC SFW2.

- Work with the janitorial contractor to adjust supplies and practices to use the right size trash can liners. Many bags sorted during the assessment were from offices and the bottom third to half of the liner had not been expanded out indicating the bag was too big for the container.
- Establish plastic shopping bag reuse dispensers in the break rooms.

#### 2.4.4. Other Solid Waste

Materials found to be actual solid waste from SFW2 was 19% of the assessed trash. For IPOC as a whole in September, 2014 this percentage was 12.5%. This difference could be a result of the assessor, an actual difference in occupant habits, or a combination of the two. Some observations are listed below:

- Coffee grounds and filters should have dedicated collection bins at the coffee pots. Loose coffee grounds contaminated many items that could have otherwise been segregated.
- Many dips, sauces and yogurts were unfinished or unused. These contaminated their plastic containers beyond recoverability. Yogurt cups especially could be emptied, have their lid fully removed, and be rinsed to increase the recovery rate.
- Some trash can liners were too contaminated to include in the clean films.
- SWF2 consumes a surprising quantity of snack bars, candy, and gum.

### 3. RECYCLING ASSESSMENT

The calculations and percentages below indicate a recycling ideal state. The actual reduction metric being sought is to reduce the waste generated per person per week from 1.3 pounds to less than 1 pound. This is to acknowledge that Zero Waste cannot be achieved by increased recycling alone, but changes in all habits that have the potential to generate waste must be evaluated.

During the SFW2 assessment, 49.8 pounds of material for recycle were correctly recycled (not including cardboard) for a diversion rate of:

$$[ 49.8 / (49.8 + 95.43) ] = \mathbf{34.3\%}$$

If all occupants participated fully in the existing recycling programs (mixed paper, rigid plastics, white paper, e-scrap, aluminum and cardboard) then the diversion rate in the following formula could have been reached:

$$\text{New recycle weight: } (49.8 + 14.55 + 6.85 + 6.56 + 0.62) = 78.38$$

$$\text{New solid waste weight: } (95.43 - 14.55 - 6.85 - 6.56 - 0.62 - 0.95 - 0.4) = 65.5$$

*Note: E-scrap and cardboard are removed from the equation.*

$$[ 78.38 / (78.38 + 65.5) ] = \mathbf{54.5\%}$$

If new diversion practices were put into place for SWF2 that are available on Sandia's main campus including wet tissue and papers, glass beverage bottles, coffee pods, non-aluminum metals, Styrofoam plates and cups, and Frito Lay snack bags, then the diversion rate in the following formula could be reached:

$$\text{New recycle weight: } (78.38 + 19.2) = 97.58$$

$$\text{New solid waste weight: } (65.5 - 19.2) = 46.3$$

$$[ 97.58 / (97.58 + 46.3) ] = \mathbf{67.8\%}$$

### **3.1. Security & Recycling**

The information security mindset we must keep with us each day must carry through to our recycling activities. In addition to the three UCI documents or document sets found in the solid waste, two more were found in the SFW2 White Paper recycling cart. We must all be vigilant to utilize the provided shredders or destruction bags when something may have a level of sensitivity.

On a positive note, no white paper was found in the Mixed Paper recycling cart. This is good because the white paper recycling process is designed to be more secure once the recycling cart is picked up in the event that incidental UCI, whereas mixed paper does not have any additional protections.

### **3.2. Problematic Recycling**

Three issues in the collected recycling material were identified:

- Clean films were being placed in the rigid plastics recycling collection. See the discussion in section 2.4.3. *Clean Films*.
- One in four used toner cartridges were not taped shut and marked “Recycle”. Placing the used toner cartridge in the box the replacement cartridge came in and then taping the box shut provides sufficient protection for the used cartridge to get remanufactured. Marking “Recycle” on the box helps the recycling pick-up crew tell the difference between new and used. Some places on campus the recycling is stored near the new supplies and it becomes difficult for the team to know what to do.
- Three pounds of mixed paper was found in the white paper recycling cart (44% contamination rate). This included copies of the Sandia Lab News, many sheets of pastel colors, and a few glossy pages. The white paper recycling is only for the type of standard computer paper used in printers and copiers, regardless of how much ink there may be.

### **3.3. Food Composting**

Sandia currently composts pre-consumer food waste at the Thunderbird Café (Building 861) and the TA4 Café (Building 960), and post-consumer food waste from the Thunderbird Café tray return and in a set of two office trailers in Tech Area 2. The vendor that would provide wet tissue and papers composting to IPOC can concurrently accept all organic debris including all types of food waste such as grease, meat, bones, dairy, and vegetables.

There have been no reports of rodents as a result of the composting infrastructure being established over the past 5 years. When exposed to summer heat, the outdoor bins have generated an odor, but the pickup schedule was adjusted to be more frequent during this season. Indoor bins must be emptied once or twice per week to prevent decomposition odors from escaping indoors. Closed lids with aeration filters would be employed if IPOC decided to divert food waste in the future.

### **3.3. Trash Can Reduction**

With a continual reduction in waste, the need for daily managed trash containers goes away. It is a future desire to see individual trash cans significantly reduced, driving up usage of small communal trash and recycling centers.

## **4. CONCLUSIONS**

Centers 800 and 3600 in IPOC are doing a very good job of recycling and waste management. There is room for improvement with the existing processes, and many other new opportunities to increase recycling and decrease waste.

An area of note to watch, and this is a corporation-wide problem, when personnel move or retire there is often minimal regard given to proper diversion for recycling. With a little bit of lead time, additional bins and support are available upon request.



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